

WHAT IS CLAIMED IS:

1. A device for withdrawing single objects from a feeder and for regularly spacing out said objects, with said feeder including an outlet channel, along which channel said objects are conveyed, arranged in a same way and in a row one after another, and a terminal section of said channel, equipped with holding means for stopping a foremost object of said row of objects, so as to temporarily hold said foremost object inside said channel;

said device including:

carrier means for hitting and catching said foremost object in said terminal section of said channel;

withdrawing means for conveying said carrier means to pass through said terminal section, for hitting and catching said foremost object, and for withdrawing said foremost object from said outlet channel, said withdrawing means being capable of overcoming the contrast action of said holding means thus causing forward movement of said row of objects until a subsequent foremost object, to be withdrawn, is retained by said holding means, and

conveying means for the withdrawn objects, operatively connected to said withdrawing means for directing and arranging the objects, regularly spaced out, along the same conveying direction and for conveying the equidistantly set objects to a manipulation station.

2. A device according to claim 1, wherein:

said carrier means include a plurality of protrusions with a shape complementary to an opening, made in a lower part of said objects;

said conveying means include at least one conveying belt for supporting said protrusions spaced out with respect to one another; and

said withdrawing means include driving means of said conveying belt, said conveying belt being moved to pass near said terminal section of said outlet channel, so that said protrusions, one by one, hit and catch respective foremost objects conveyed from said outlet channel to the relative terminal section, and so that single objects are withdrawn and conveyed, spaced out, by said protrusions along the conveying direction toward said manipulation station.

3. A device according to claim 2, wherein said conveying belt supports a plurality of protrusions, which are regularly spaced apart by a predetermined distance, said protrusion hitting and catching, one by one, respective foremost objects, and conveying the withdrawn objects toward said manipulation station.

4. A device according to claim 3, wherein said conveying belt is arranged beside a conveying line of bottles, with which said withdrawn and equidistant objects are to be coupled, with said conveying line conveying the bottles to said manipulation station.

5. A device according to claim 4, wherein said conveying belt is moved in the direction opposite to the movement direction of said conveying line.

6. A device according to claim 5, wherein said conveying belt is an endless conveying belt.

7. A device according to claim 3, wherein said conveying belt transfers and positions said objects, withdrawn and regularly spaced apart by said protrusions, in said manipulation station, so that a group of said objects faces and is opposite to a corresponding group of containers conveyed by said conveying line to the manipulation station.

8. A device according to claim 7, wherein characterized in that a robotized handling device is situated in said manipulation station for picking up and transferring said group of objects from the protrusions of said conveying belt to said conveying line, in order to couple the objects with said group of containers.

9. A device according to claim 8, wherein said robotized handling device includes a working head, which moves a plurality of pick up means, whose number is equal to or bigger than the number of objects to be coupled to the group of containers.

10. A device according to claim 8, further including sensor means, situated in said manipulation station for verifying the presence of said objects on the respective protrusions.

11. A device according to claim 8, further including sensor means, situated in said manipulation station for detecting the correct matching of the position of said group of objects on the conveying belt with respect to the position of said group of containers on said conveying line.

12. A device according to claim 4, wherein said conveying belt and said conveying line are operated stepwise, in mutual step relation.

13. A device according to claim 7, further including at least two conveying belts, situated one beside another and beside a line for conveying containers, with which containers said objects are to be coupled, with each of said conveying belts passing near a terminal section of an outlet channel of respective feeders of objects to be coupled with said containers, so that the protrusions, one by one, hit and catch respective foremost objects conveyed by said outlet channels to the terminal station, said conveying belts withdrawing single objects and conveying said objects, regularly spaced apart by said protrusions, to said manipulation station.